

Illinois Environmental Protection Agency
Bureau of Air
Permit Section

September 2014

Responsiveness Summary For
Questions and Comments on the
Construction Permit Application from
Cronus Chemicals, LLC, for a
Urea and Ammonia Production Facility in
Tuscola, Illinois

Source Identification No.: 041804AAF
Application No.: 13060007

Table of Contents

| | <i>Page</i> |
|--|-------------|
| Decision..... | 1 |
| Background..... | 1 |
| Comment Period | 1 |
| Availability of Documents..... | 1 |
| Appeal Provisions..... | 2 |
| Questions and Comments with Responses by the Illinois EPA | 2 |
| General Comments..... | 14 |
| For Additional Information | 15 |
| Listing of the Significant Changes between the Draft and Issued Permits..... | 16 |

DECISION

On September 5, 2014, the Illinois Environmental Protection Agency (Illinois EPA) issued an air pollution control construction permit/PSD approval to Cronus Chemicals (Cronus) to construct a urea and ammonia production facility in Tuscola. In response to comments on the draft permit, in the issued permit a number of changes and additions have been made to the requirements for the proposed project compared to the draft permit.

Copies of the documents can be obtained from the contact listed at the end of this document. The permit and additional copies of this document can also be obtained from the Illinois EPA website www.epa.state.il.us/public-notices/.

BACKGROUND

On February 14, 2014, the Illinois EPA, Bureau of Air received a construction permit application from Cronus requesting a permit to construct a urea and ammonia production facility in Tuscola. The principle emission units at the facility would be an ammonia plant, a reformer furnace, a boiler and a urea plant. The ammonia plant would make ammonia that would either be further processed in the urea plant or stored for direct sale.

The construction permit issued for this project identifies the applicable rules governing emissions from the proposed reformer, auxiliary boiler and other emission units that are part of the project, and establishes enforceable limitations on their emissions. The permit also establishes appropriate compliance procedures, including requirements for emissions testing, continuous emission monitoring, recordkeeping and reporting. Cronus will be required to carry out these procedures on an ongoing basis to demonstrate that the proposed facility is operating within the limits established by the permit and that emissions are being properly controlled.

COMMENT PERIOD

The Illinois EPA Bureau of Air evaluates applications and issues permits for sources of emissions. An air permit application must appropriately address compliance with applicable air pollution control laws and regulations before a permit can be issued. Following its initial review of Cronus' application, the Illinois EPA Bureau of Air made a preliminary determination that the application met the standards for issuance of a construction permit and prepared a draft permit for public review and comment.

The public comment period began with the publication of a notice in The News Gazette on May 12, 2014. The notice ran again in The News Gazette on May 19, 2014 and May 26, 2014. Additionally, the notice ran on May 13th, 20th and 27th, 2014 in the Tuscola Journal. A public hearing was held on June 26, 2014 at the Tuscola High School to receive oral comments and answer questions regarding the application and draft construction permit. The comment period closed on July 25, 2014.

AVAILABILITY OF DOCUMENTS

The permit issued to Cronus and this responsiveness summary are available at the Illinois EPA's internet site at <http://www.epa.state.il.us/public-notices/>.¹ Copies of these documents may also be obtained by contacting the Illinois EPA at the telephone numbers listed at the end of this document.

APPEAL PROVISIONS

The construction permit issued for the proposed project grants approval to construct pursuant to the federal rules for Prevention of Significant Deterioration of Air Quality (PSD), 40 CFR 52.21. Accordingly, individuals who submitted comments on the draft permit or participated in the public comment period may petition the United States Environmental Protection Agency (USEPA) to review the PSD provisions of the issued permit. In addition, any person who failed to file comments on the draft permit may petition for administrative review but only to the extent changes were made to the draft permit by the final permit decision.

As comments were submitted on the draft permit for the proposed project that requested a change in the permit, the issued permit does not become effective until after the period for filing of an appeal has passed. The procedures governing appeals are contained in the Code of Federal Regulations, "Appeal of RCRA, UIC and PSD permits," 40 CFR 124.19. If an appeal request will be submitted to USEPA by a means other than regular mail, refer to the Environmental Appeals Board website for instructions (http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf). If an appeal will be sent by regular mail, it should be sent on a timely basis to the following address:

U.S. Environmental Protection Agency
Clerk of the Board, Environmental Appeals Board (MC 1103B)
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460-0001
Telephone: 202/233-0122

QUESTIONS AND COMMENTS WITH RESPONSES BY THE ILLINOIS EPA

(Each question or comment is followed by the response by the Illinois EPA in bold-face type.)

1. The Project Summary prepared by the Illinois EPA to accompany the draft permit indicates that the nominal capacity of the facility would be 2,789 tons of ammonia per day and 4,880 tons of urea per day. The announced capacities of the facility on an annual basis are 800,000 tons of ammonia and 1,400,000 tons of urea. If I put these two sets of

¹ This information may also be available on the Illinois Permit Database operated by USEPA, at <http://www.epa.gov/reg50air/permits/ilonline.html>.

numbers together,² the facility would only operate for 287 days each year, which cannot be right. Why is there this discrepancy?

The discrepancy noted in this comment is due to the fact that the “announced capacities” of the facility cited by this comment do not accurately describe the capacities of the proposed facility as formally provided by Cronus in its application³ and reflected in the permit. This may be due to the way that the capacity of the facility has been interpreted and reported in the media. This can be confusing because the facility would be designed to produce some ammonia for direct sale without being further processed into urea. The amount of ammonia that would actually be produced for direct sale by the facility would vary year to year depending on the seasonal demand for ammonia by farmers.⁴

2. The provisions for revision of the Best Available Control Technology (BACT) limit for GHG in Condition 2.1.2-3 pose a concern.⁵ Draft Condition 2.1.11 (a)(i) would provide that the GHG BACT limit in Condition 2.1.2-3

...shall be lowered based on actual operation and emissions of the facility unless the Permittee demonstrates and the Illinois EPA concurs, based on an evaluation as provided pursuant Condition 2.1.11(b), that the resulting limit cannot be reliably met without unacceptable consequences, i.e., inability to comply with other emission limits or requirements or significant risk to equipment or personnel, and without unreasonable consequences, i.e., a significant increase in maintenance and repair needed for the facility.

Draft Condition 2.1.11(a)(ii) would provide that this GHG BACT limit "shall

² For example, 800,000 tons of ammonia per year divided by 2,789 tons of ammonia per day is 286.8 days per year.

³ The application indicates that the nominal daily production capacity of the facility will be 2,789 tons of ammonia and 4,880 tons of urea. (For example, refer to Appendix A, Tables 4 and 9, respectively.)

⁴ Pursuant to Condition 2.1.5-1(a)(i) of the permit, the facility's production of ammonia is limited to 1,018,000 tons/year. This is consistent with the nominal daily production capacity for the facility, as restated in the Project Summary, i.e., 2,789 tons/day. (2,789 tons/day x 365 days/year = 1,018,000 tons/year.)

If all of the ammonia that the facility is permitted to produce annually were made into urea, the facility would produce 1,781,200 tons of urea/year. This is the annual urea production capacity of the facility if no ammonia were sold. It is consistent with the nominal daily ammonia production capacity for the facility as stated in the Project Summary, i.e., 4,880 tons/day. (4,880 tons/day x 365 days/year = 1,781,200 tons/year.)

The permit does not set a limit for production of urea by the facility because urea production is directly constrained by the amount of ammonia that is available for conversion into urea. About 0.57 tons of ammonia is used to make a ton of urea or about 1.75 tons of urea are produced from a ton of ammonia.

The permit also addresses the facility's capability to produce ammonia for direct sale. Condition 2.1.5-1(a)(ii) limits annual production of ammonia for direct sale to 255,000 tons/year. In a year in which 255,000 tons of ammonia were sold and not converted into urea, the facility could only produce 1,334,950 tons of urea. (1,781,200 tons - (255,000 tons x 1.75) = 1,334,950 tons). Accordingly, the annual urea production capacity of the facility could vary in practice from 1,334,950 to 1,781,200 tons depending on how much ammonia is made for direct sale and not further processed into urea.

⁵ Condition 2.1.2-3 would set a single GHG BACT limit, in tons of carbon dioxide equivalents (CO₂e) per ton of ammonia produced for the combined GHG emissions of the reformer furnace, the boiler, the main CO₂ vent in the ammonia plant and the CO₂ vent in the urea plant. The limit would apply on an annual average and is set by an equation that accounts for the quantities of ammonia sent to the urea plant and to storage for direct sale. A higher limit would apply during the shakedown of the facility before commissioning of the facility is completed.

automatically be lowered" to a specified value if the Permittee fails to conduct the required evaluation or does not complete the evaluation in a timely manner. Pursuant to Condition 2.1.11(b), if the Permittee elects to perform an evaluation for GHG emissions, the evaluation would need to be completed within three years after the date that commissioning of the facility is complete or four years after initial startup, whichever occurs first (extendable by an additional two years). Draft Condition 2.1.11 (a)(iii) further provides that if the GHG BACT limit must be revised based on the evaluation, the revision would be performed through a permit revision.

One concern about these provisions is that the evaluation period should be mandatory. The conditions requiring an evaluation period and potentially a permit revision reflect an uncertainty in the proposed GHG BACT limit. USEPA recognizes that in some circumstances, it may be acceptable to establish BACT limits that can be adjusted or revised as the performance of a technology becomes clearer after a period of operation.^{6, 7} In this case, the Illinois EPA justifies the evaluation period by pointing to "the lack of data for GHG emission rates of ammonia plants and facilities that are similar to the facility that is proposed." Project Summary at 25. This lack of data resulted in the uncertainty with the proposed BACT limit. Given the Illinois EPA's uncertainty with the BACT limit due to insufficient emissions information, the evaluation period should not be optional.

Upon further consideration in response to this comment, in the issued permit, the evaluation period followed by possible downward adjustment of this BACT limit, to increase the stringency of this limit, is now mandatory. The issue that is effectively posed by this comment is whether data is available for the GHG emissions of facilities that produce both urea and ammonia for sale that shows that a limit lower than the one that results from the default values in Draft Condition 2.1.11(a)(ii) will not be achievable. While it is very unlikely that such a lower limit will be achievable, the available data is not sufficient to make such a showing. Accordingly, the issued permit provides for the possibility that an even lower GHG emission limit is achievable. The issued permit no longer includes default values for the GHG emission rates associated with production of ammonia for conversion into urea and for sale. In the absence of any default values, the evaluation by Cronus of the GHG emission rate that is achievable by the ammonia manufacturing process must necessarily become mandatory.⁸

⁶ See *In re Prairie State Generating Company*, 13 E.A.D. 3, 84-85 (EAB 2006); *In re AES Puerto Rico, L.P.*, 8 E.A.D. 324, 348-350 (EAB 1999); *In re Hadson Power 14-Buena Vista*, 4 E.A.D. 258, 291 (EAB 1992).

⁷ USEPA has previously also observed that a BACT re-evaluation is appropriate if it can be determined that errors, faulty data, or incorrect assumptions contained in the original BACT analysis resulted in what may be inappropriate BACT emission levels. See Memorandum from Gary McCutcheon and Michael Trutna to J. David Sullivan, "Request for Determination on Best Available Control Technology Issues - Ogden Martin Tulsa Municipal Waste Incinerator Facility," November 19, 1987. However, there is no indication that Cronus intentionally acted to misrepresent or conceal data in its application.

⁸ **As this evaluation would now be mandatory, the issued permit also requires Cronus to submit annual progress reports for this evaluation. This is because this evaluation is now a prerequisite to the adjustment of the BACT limit. Progress reports are appropriate to facilitate review by the Illinois EPA and other interested parties of the data that is being collected while the evaluation is underway.**

3. Another concern about the provisions in the draft permit for revision of the BACT limit for GHG is that the magnitude of the adjustment to the BACT limit should not be restricted. In the Project Summary, page 25, the Illinois EPA states that "it would be unrealistic to expect that the actual performance considering the units that combust fuel, i.e., the reformer furnace and boiler, will be 20 percent better than the design performance" but this assertion does not appear to be supported by actual emissions data or engineering analysis. For this reason, the permit should not restrict the revision BACT limit to a limit as specified in Condition 2.1.11(a)(ii) since the evaluation may reveal that a lower BACT limit is achievable.

As already discussed, the issued permit would not restrict the downward adjustment of the BACT limit to the limit that would result from the default values for GHG emission rates specified in Draft Condition 2.1.11(a)(ii). This is because the issued permit would make the evaluation of the GHG emission rate that is achievable by the facility mandatory. As a consequence, the magnitude of any downward adjustment that results from this evaluation cannot be restricted by the permit since any such adjustment must consider the results of this evaluation.⁹

4. To comply with the limits for GHG emission for the main CO₂ vent in the ammonia plant and the pressure control CO₂ vent in the urea plant, Draft Condition 2.1.8-3(a) would require the source to perform representative sampling and analysis "of the CO₂ stream from the regenerator that is emitted through the affected CO₂ vents and other gas streams in the ammonia plant that are or could be vented to the affected flares during startup, shutdown or malfunctions."¹⁰ This sampling and analysis for CO, VOM, methane, CO₂ and HAP content would be conducted within 60 days after achieving the maximum production rate at which the ammonia plant will be operated but not later than 180 days after initial startup, and upon request. On-going, periodic sampling and analysis is not addressed. For the CO₂ vents, the issued permit should specify a frequency for periodic sampling and analysis that is sufficient to generate data necessary to verify continuous compliance with the applicable emission limits for GHG, as CO₂e, CO, VOM and HAPs.

In the issued permit, requirements for periodic sampling and analysis have been added, as requested by this comment. Sampling and analysis for the streams going to the CO₂ vents, is required on at least a monthly basis. This is consistent with the frequency of samplings and analysis of natural gas required for ammonia manufacturing by 40 CFR 98.74(c).^{11, 12}

⁹ An "automatic adjustment" to the BACT limit, as would have been provided by the draft permit, would generally only be appropriate in circumstances in which such an adjustment is provided for as an alternative to conducting an evaluation. Accord., *In re Prairie State generating Company*, 13 E.A.D. 3 (EAB 2006).

¹⁰ Draft Condition 2.1.8-1 would also require continuous monitoring of gas flows from the CO₂ vents (scf); continuous measurement of ammonia plant production (tons/hour); measurement of key operating parameters of the ammonia plant, including temperatures in the ammonia conversion reactor and the methanation reactor, and flow of off-gas to the reformer furnace for use as fuel.

¹¹ Under 40 CFR 98 Subpart C, under the Tier 2 and Tier 3 methodologies, sampling and analysis of natural gas is only required on a semi-annual basis. (See 40 CFR 98.34(a)(2)(i) and (b)(3)(A).)

¹² For the other process streams in the ammonia plant, which would be vented to a flare during startup, shutdown or malfunction, sampling and analysis is now required on at least a monthly basis during the first year of operation and on at least a quarterly basis thereafter. This is appropriate for these streams as waste

5. The record does not explain why the Illinois EPA rejected the applicant's proposal to use a continuous emissions monitoring system (CEMS) to monitor CO₂ emissions from the main CO₂ vent in the ammonia plant. While USEPA recognizes that use of a CEMS is not the only way to accurately and reliably monitor compliance, it is unclear in this instance whether the monitoring methodology for CO₂ that was included in the draft permit is as or more accurate and reliable than the methodology proposed by Cronus. As USEPA has previously noted, for long-term emissions estimates (such as annual emissions), CEMS data is expected to provide the most accurate data as emissions are being measured directly over the entire period of interest.¹³ Should the Illinois EPA have a legitimate reason for rejecting use of a CEMS, as proposed by Cronus, the permit should specify a sampling and analysis frequency that is sufficient to generate data necessary to verify continuous compliance with the applicable limits for GHG as CO₂e.

For the Main CO₂ vent, the combination of continuous flow monitoring and periodic sampling and analysis of the composition of the exhaust stream is appropriate to quantify the CO₂ emissions from this vent. For the Main CO₂ vent, this approach is expected to provide comparable or better emission data than a CEMS. This is because this stream is primarily CO₂ and is a “process stream,” as well as an emission stream. In this regard, while the emission data in the application addressed the presence of constituents other than CO₂ in this stream, the emission data in the application was also based on the stream being 100 percent CO₂.¹⁴ In this context, where CO₂ will compose over 99 percent of the stream, analysis of the CO₂ content of representative samples of this stream in a laboratory is expected to provide more accurate measurements than the continuous measurements provided *in situ* with a CEMS. In addition, as this stream will usually be sent to the urea plant and function as an intermediate for production of urea, the ammonia plant must necessarily be operated to maintain a consistent composition in this stream.

While Cronus’ application indicated that a CO₂ CEMS would be used on the Main CO₂ Vent, this was based on the preliminary engineering plans for the facility and Cronus’ expectations for what would be required by the permit. It should not be considered to restrict the Illinois EPA’s responsibility to set appropriate compliance procedures as part of the processing of the application. These comments also do not demonstrate that the approach that is being taken is unsound. In this regard, the comment refers to a 2001 document that addresses the determination of emissions

gases from portions of only a single process unit would be flared, rather than waste gases from multiple process units as occurs at a petroleum refinery, where common flares typically serve a number of different process units. In addition, more frequent data is required to be collected during the initial operation of the ammonia plant, when one would normally expect more flaring to occur as part of shakedown.

¹³ See Preferred and Alternative Methods for Estimating Air Emissions from Boilers, EIIP Volume II: Chapter 2 (1/8/2001) at 2.3-5.

¹⁴ As described in the application, the main contaminant in the CO₂ stream will be residual hydrogen carried over from ammonia synthesis into this stream. Cronus will operate to manage the level of hydrogen in the stream. This is because this hydrogen would otherwise be available for use in production of ammonia. In addition, when the CO₂ stream is sent to the urea plant, the hydrogen must be removed from the stream by catalytic oxidation before the stream is used in the production of urea.

from boilers and not the CO₂ emissions associated with concentrated CO₂ streams associated with purification of synthesis gases.¹⁵ The comment also does not indicate that any consideration was given to the purity of this particular stream or the fact that it is both an emission stream and a process stream.

A more relevant and timely source of guidance for the appropriate monitoring methodology for CO₂ emissions from the main CO₂ vent is USEPA's rules for Mandatory Greenhouse Gas Reporting, 40 CFR Part 98. Appropriate methodology for monitoring the CO₂ emissions of production process units that capture and supply CO₂ for commercial applications is set out in 40 CFR Part 98 Subpart PP, Suppliers of Carbon Dioxide. It is reasonable to apply this methodology to the CO₂ emissions from the main CO₂ vent at the facility because the typical disposition of this stream will be for use in production of urea, i.e., in a commercial application. 40 CFR Part 98 Subpart PP provides for monitoring of CO₂ emissions from CO₂ vents by a combination of flow monitoring and periodic analysis of the composition of the vented stream. This is the approach that has been taken for the main CO₂ vent at this facility as well as the much smaller CO₂ vent at the urea plant.

In response to this comment, changes have been made in the provisions of the issued permit for the CO₂ vents to clarify the required approach to the determination of GHG emissions. The issued permit explicitly provides that the GHG emissions of these vents shall be determined using the appropriate methodology under 40 CFR Part 98 Subpart PP.¹⁶

6. It is not clear why the CO₂ emission monitoring methodologies for the boiler and the reformer furnace (reformer) are significantly different. For the boiler, a CO₂ CEMS is not

¹⁵ The disclaimer at the beginning of the cited document specifically provides, These documents are non-binding guidance and not rules. [US]EPA, the States and others retain the discretion to employ or require other approaches that meet the requirements of the applicable statutory or regulatory requirements in individual circumstances.
Preferred and Alternative Methods for Estimating Air Emissions from Boilers, Emission Inventory Improvement Project, Volume II: Chapter 2, January 8, 2001, p. ii.

¹⁶ Pursuant to 40 CFR Part 98, Cronus will also be required to determine GHG emissions of the ammonia plant as a whole in accordance with 40 CFR Part 98 Subpart G, Ammonia Manufacturing. Under 40 CFR Part 98 Subpart G, Cronus must determine CO₂ emissions for manufacturing of ammonia by tracking the amount of carbon in the natural gas feedstock introduced into the ammonia plant. Because ammonia does not contain carbon, other than the carbon that becomes CO₂ that is used in production of urea, essentially all carbon in the feedstock to the ammonia plant is emitted to the atmosphere as CO₂. The "carbon" used in production of urea can be determined from production data for urea. The trace amounts of carbon that are emitted as methane from the reformer can also be separately determined using emission factors and the amount of natural gas burned in the reformer.

This emission data for the ammonia plant collected pursuant to 40 CFR Part 98 Subpart G will provide further confirmation of the plant's GHG emissions. However, this data cannot be used to directly determine emissions for purposes of the permit because it does not distinguish between the emissions of the reformer, the CO₂ vents and the flares. For purposes of the emission limits set by the permit, separate data is needed for the GHG emissions of each of these emission units, as will be addressed by the requirements for monitoring, testing and recordkeeping in the issued permit.

Incidentally, for ammonia manufacturing, 40 CFR 98.72 also provides that a source must report CO₂ emissions collected and transferred off-site from ammonia manufacturing following the procedures for calculating GHG emissions in 40 CFR 98 Subpart PP, Suppliers of CO₂.

required but a CO₂ CEMS is required for the reformer. Because the potential GHG emissions of the boiler are nearly as much as the reformer (i.e., about one third of the facility-wide potential GHG emissions), and the two units are subject to the same BACT limit, it appears reasonable to expect that the CO₂ emission monitoring required for the boiler would be similar to that required for the reformer. While a CEMS is not the only accurate and reliable means for monitoring compliance, it is unclear how the Illinois EPA determined that a CO₂ CEMS was not appropriate for the boiler and that a different methodology for measuring CO₂ emissions from the boiler was more appropriate in this case. Please explain.

The approaches that would be required for monitoring the CO₂ emissions of the boiler and the reformer are different because the reformer will burn process off-gas, as well as natural gas. USEPA's rules for Mandatory Greenhouse Gas Reporting: General Stationary Fuel Combustion Sources, 40 CFR Part 98 Subpart C, provide for different methodologies for monitoring the CO₂ emissions of these units. In 40 CFR Part 98 Subpart C, USEPA developed a number of different methodologies for monitoring CO₂ emissions of fuel combustion units, including boilers and process heaters like those at the proposed facility. The applicable monitoring methodologies under these rules depend on various factors, including the fuel(s) that are burned, the size of a unit and the emissions monitoring that is required by other applicable rules.

As a general matter, the Illinois EPA has determined that the applicable methodologies under 40 CFR Part 98 Subpart C appropriately address monitoring of the CO₂ emissions of the boiler and the reformer furnace.¹⁷ These rules, which were last updated in November 2013, reflect specific consideration by USEPA of appropriate methodologies to measure and monitor CO₂ emissions from different fuel combustion sources.¹⁸ The available methodologies in these rules for units that only burn natural gas, like the boiler at this facility, are simpler than those for units that burn significant quantities of process off-gases, like the reformer furnace.¹⁹ These simpler methodologies are not available for units like the reformer furnace at this facility. The difference in available approaches is reasonable. Natural gas is a commercial fuel whose composition does not vary because of the actual operation of

¹⁷ More broadly, 40 CFR Part 98 Subpart C provides appropriate methodology for determining the GHG emissions of the boiler and the reformer furnace at the facility, as it addresses emissions of methane and nitrous oxide, as well as emissions of CO₂.

¹⁸ For example, refer to: 1) The USEPA's rulemaking proposal in the Federal Register (74 FR 16448, April 10, 2009); 2) The USEPA's *Technical Support Document for Stationary Fuel Combustion Emissions: Proposed Rule for Mandatory Reporting of Greenhouse Gases*, January 30, 2009; and 3) The USEPA's *Mandatory Greenhouse Gas Reporting Rule: EPA's Response to Public Comments, Volume No. 15, Subpart C -- General Stationary Fuel Combustion Sources*, September 2009.

¹⁹ Under 40 CFR Part 98 Subpart C, the CO₂ emissions of the boiler may be determined using "Tier 2 Calculation Methodology" or, at the option of the source, the Tier 3 or Tier 4 Calculation Methodologies. The CO₂ emissions of the reformer furnace must be determined using the "Tier 4 Calculation Methodology."

A key feature of the Tier 4 Calculation Methodology is that it requires monitoring for the volumetric flow of stack gas in addition to monitoring for the concentration of CO₂ or, in some cases, the concentration of CO₂ or oxygen in the exhaust. (For natural gas-fired units, either the concentration of CO₂ or oxygen in the exhaust may be monitored, as provided by 40 CFR 98.33(a)(4)(iv).)

a source. The composition of process off-gases is site-specific and can vary based upon how a process actually operates. As such, the CO₂ emissions that result from burning natural gas may be more readily determined than the CO₂ emissions from burning a mixture of natural gas and process off-gas.

7. The Draft Permit would not specify how GHG emissions (as CO₂e) from the boiler will be monitored. Condition 2.3.9(g) would require the source to keep records of its GHG emissions from the boiler including a file containing the emission factors that it uses to calculate emissions, with supporting documentation. However, the Draft Permit would not specify the emissions calculation methodology, emission factors or emission factor sources based upon which the source is expected to calculate emissions. Please specify how GHG emissions from the boiler will be monitored and how the source is expected to calculate emissions.

In response to this comment, changes have been made in the issued permit to clarify the required approach to the determination of GHG emissions from the boiler. For the boiler, the issued permit explicitly provides that GHG emissions including CO₂ emissions, shall be determined using appropriate methodology under 40 CFR Part 98 Subpart C. As already discussed, these USEPA rules lay out appropriate methodology for the determination of the GHG emissions of the boiler.²⁰

8. The monitoring requirements for emissions of PM, PM₁₀, PM_{2.5}, VOM, methane (CH₄), nitrous oxide (N₂O) and HAP from the reformer appear to be inadequate to assure continuous compliance with the emission limits. Draft Condition 2.2.7 would require the source to conduct initial performance tests on the reformer for PM, PM₁₀, PM_{2.5}, VOM, hexane, CH₄, N₂O and HAP. Subsequent periodic testing would be required to be conducted within 90 days of a written request by the Illinois EPA or such later date agreed to by the Illinois EPA. Draft Condition 2.2.7(a)(i) would provide that specific requirements for periodic emission testing "may be established in the CAAPP permit for the facility."²¹ Please add periodic testing requirements for emissions of these pollutants from the reformer or explain how the permit will otherwise assure continuous compliance without such testing for these pollutants.

In response to this comment, the issued permit requires periodic emission testing for the reformer, with testing conducted at least every five years (new Condition 2.2.7(a)(ii)(B)). As this testing will address emissions of pollutants from the reformer other than NO_x and CO, more frequent testing is not needed.²² This is because emission levels should be maintained as part of the normal operating and maintenance practices for the reformer. In addition, if the initial emission testing indicates levels of emissions that warrant more frequent testing, Cronus must

²⁰ For consistency, similar changes were also made to the provisions of the permit for the reformer.

²¹ The NO_x, CO and CO₂ emissions of the reformer will be monitored by CEMS pursuant to Condition 2.2.8-1.

²² Continuous emission monitoring is required for NO_x and CO. This monitoring will address proper operation of the combustion system of the boiler and the add-on SCR control system to assure compliance with the emission limits for NO_x and CO.

conduct such testing as directed by the Illinois EPA.^{23, 24}

9. The monitoring requirements for emissions from the boiler also appear to be inadequate to assure continuous compliance with the applicable emission limits. For the boiler, Draft Condition 2.3.7 would require initial performance testing for emissions of PM, filterable PM₁₀ and PM_{2.5}, condensable PM, VOM, formaldehyde, hexane, methane and N₂O from the boiler, noting that specific requirements for periodic emission testing "may be established in the CAAPP permit for the facility."²⁵ However, subsequent periodic testing is not required for these pollutants. Please add periodic testing requirements for emissions of these pollutants from the boiler or explain how the permit conditions will otherwise assure continuous compliance without such testing for these pollutants.

In response to this comment, the issued permit also requires periodic emission testing for the boiler at least every five years (new Condition 2.3.7(b)(i)(B)). In this regard, the circumstances for the boiler are similar to those for the reformer.

10. As written, Draft Condition 2.2.7(a)(ii) would allow the source to conduct the initial performance testing of the reformer *either* within one year after initial startup *or* within 120 days after achieving the maximum production rate at which this unit will be operated. Please add "whichever occurs first" or similar language to this provision so that the required testing is required within a reasonable time period.

The additional clause requested by this comment has been added to the issued permit. This clause was inadvertently omitted from this condition. It was intended that the initial emission testing of the reformer be conducted within 120 days of the date after which it achieves the maximum production rate at which it will be operated and, in no case, later than one year after its initial startup.²⁶

11. The receptor grid spacing for the air quality analysis appears to be inadequate for demonstrating that the proposed source will not cause or contribute to violation of any national ambient air quality standard. The air quality modeling documentation included in the permit record states that Cronus used a receptor resolution starting with a 100 meter spacing from the property boundary.²⁷ It is unclear from the available documentation whether a tighter receptor grid was employed around the fence line. The permit record shows that the modeled peak air quality impacts occurred very close to the

²³ Condition 2.3.7(b)(i)(C) provides that, in addition to the emission testing specified by the permit, Cronus shall have testing performed for the boiler as requested by the Illinois EPA within 45 days of a written request by the Illinois EPA or such later date agreed to by the Illinois EPA.

²⁴ In addition, during the processing of the application for an operating permit for the facility under Illinois' Clean Air Act Permit Program (CAAPP), the Illinois EPA will need to reassess the appropriate frequency for periodic emission testing for the reformer. This is because a CAAPP permit must require appropriate Periodic Monitoring, which among other things, may include requirements for emission testing, to assure compliance with the various air pollution control requirements that apply to the emission units at a source.

²⁵ The NO_x and CO emissions of the boiler will be monitored by CEMS pursuant to Condition 2.3.8-1.

²⁶ For example, refer to Condition 2.3.7(b)(i)(A), which requires the initial performance testing of the boiler to be conducted within 60 days after achieving the maximum rate at which the boiler will be operated but not later than 365 days after initial startup of the boiler.

²⁷ See Air Quality Modeling Report, Cronus Chemicals, LLC, Section 5.1.5 (April 2014).

facility's fenceline. Please confirm that a tighter receptor grid was used around the fenceline or require Cronus to conduct air quality modeling using a tighter receptor grid (e.g., 50 meters) to evaluate peak impacts near the facility.

In response to this comment, the Illinois EPA has checked the receptor spacing in the most recent air quality analyses submitted for the project. This review of the actual modeling files confirmed that for all modeling scenarios in these analyses, the receptor spacing along the fence line of the facility is 50 meters.

12. The conditions of the draft permit limiting the facility's Potential to Emit (PTE) Hazardous Air Pollutants (HAPs) to below major source thresholds appear to be inadequate. The draft permit would include limits on HAP emissions in Condition 2.1.6(a) (individual HAP limit for the ammonia plant; no total HAP limit); Condition 2.2.6(a) (individual and total HAP limits for the reformer furnace); Condition 2.3.6(a) (individual and total HAP limits for the boiler); Condition 2.4.6(a) (total HAP limit for the startup heater; no individual HAP limit); Condition 2.8.6(a) (total HAP limit for equipment leaks; no individual HAP limit); Condition 2.11.5(a) (total HAP limit for the emergency engines; no individual HAP limit); and Condition 2.11.5(a) (total HAP limit for fire pump engines; no individual HAP limit). Condition 1.5 states that these HAP emission limits are designed to ensure that the facility is not a major source of HAPs. However, the Draft Permit would not include a limit on HAP emissions from the urea plant even though the application indicates that HAP emissions from the urea plant could potentially be higher than HAP emissions from the startup heater, emergency generator engines, equipment leaks and the fire pump engines combined. The Draft Permit also would not include a limit on total HAP emissions from the ammonia plant. To ensure that the facility-wide restriction on HAP emissions is practically enforceable, the permit should include a limit on total HAP emissions from the ammonia plant along with requirements for verifying continuous compliance with that limit.

The issued permit includes a limit for the total HAP emissions of the ammonia plant, as requested by this comment. It also includes accompanying compliance provisions as discussed later in response to another comment. The relevant changes to the permit include changes to Condition 2.1.6(a), which contains the emission limits for the ammonia plant, enhancements to Condition 1.5, which generally addresses the facility's HAP emissions, and the addition of Attachment 2, which sets out limits for the emissions of individual HAPs and total HAP from the various emission units at the facility.

In general, the draft permit would only have set limits for emissions of HAPs from the various emission units at the facility as needed to limit the facility's HAP emissions to below the major source thresholds for HAPs. Accordingly, the draft permit would generally have set limits for HAP emissions from emission units from which there would be more than trace levels of emissions. In this regard, the HAP that is expected to be emitted from the ammonia plant in measureable amounts is

methanol.²⁸ Accordingly, the draft permit would only have addressed the emissions of individual HAPs from the ammonia plant. This would have served to limit both the emissions of methanol and total HAPs from the ammonia plant since emissions of HAPs other than methanol from the ammonia plant will be trivial. However, to more fully address the HAP emissions of the facility, the issued permit also limits the total HAP emissions of the ammonia plant, explicitly requiring that the ammonia plant have at most trace emissions of HAPs other than methanol.

The issued permit also more comprehensively addresses the HAP emissions of the facility, serving to further assure that the HAP emissions of the facility are limited to levels at which the facility would not be a major source for HAPs. New Condition 1.5(b) and new Attachment 2 in the issued permit now address the permitted emissions of HAPs from all emission units at the facility.²⁹

13. To ensure that the facility-wide restriction on HAP emissions is practically enforceable, the permit should also include a limit on total HAP emissions from the urea plant along with requirements for verifying continuous compliance with that limit.

The issued permit explicitly limits the total HAP emissions of the urea plant. As already discussed, the issued permit more thoroughly limits the HAP emissions of the various operations and emission units at the facility, including the urea plant. These limits are accompanied by compliance provisions, as also requested by this comment.³⁰ The additional provisions more clearly assure that the HAP emissions of the facility are limited to below the levels at which the facility would be a major source for HAP.

14. To ensure that the facility-wide restriction on HAP emissions is practically enforceable, the permit should also specify how the source will calculate HAP emissions; e.g., using emission factors derived from stack testing or other specified method. The Draft Permit would require the source to keep a file containing the emission factors that it uses to calculate emissions, with supporting documentation, but the Draft Permit would not specify the emission calculation methodology, emission factors or emission factor

²⁸ Methanol is present in the stream from the CO₂ vents due to carryover of methanol from the CO₂ adsorption solvent into this stream.

²⁹ In new Attachment 2 in the permit, the emission limits for individual HAPs from the various emission units are either: 1) “Generic,” with one emission limit set to address emissions of any individual HAP, or 2) “Speciated,” with separate emission limits set for hexane, formaldehyde and methanol and one limit set to address emissions of individual HAPs other than hexane, formaldehyde and methanol. This approach is taken to ensure that the emissions of hexane, formaldehyde and methanol are limited so that the PTE of each of these individual HAPs is less than 10 tons per year.

³⁰ As also already discussed, the draft permit would only have set limits for emissions of HAPs as considered necessary to restrict HAP emissions from various emission units and the facility. Accordingly, the draft permit would not have limited the HAP emissions of the urea plant. Instead, it would have relied on the limit for emissions of volatile organic material (VOM) from the urea plant to also indirectly limit its emissions of HAPs. The VOM emitted from the urea granulator will be from formaldehyde and methanol in the resin applied to the urea pellets in the granulator that are not incorporated into the urea product or controlled by the scrubbing system. Accordingly, all VOM emitted by the urea plant is expected to be HAPs.

sources that the source is expected to use when calculating emissions.³¹ *See*, for example, Conditions 2.1.9-2(d), 2.2.9(g)(ii), 2.3.9(g)(ii) and similar conditions.

The issued permit includes an additional provision setting forth how compliance with limits for emissions of HAPs is to be determined, as generally requested by this comment. In particular, new Condition 1.5(b) in the issued permit provides that compliance with permit limits for HAP emissions for various emission units shall be determined based on activity and operating data for those units and emission factors that do not understate actual emissions of those units, as developed from representative testing or analysis for the emission unit, USEPA methodology, or other authoritative sources of information.

This approach to compliance with permit limits for HAP emissions is dictated by the nature of the subject emission units and the available methodology to determine the actual HAP emissions of these units which dictates that compliance with the limits for HAP emissions must be determined using emission factors.^{32, 33} When emission factors are used to calculate emissions, the critical element of the calculations is the emission factors that are selected for use. The construction permit require Cronus to keep a file or records that contains the emission factor(s) that it uses to determine actual emissions for purposes of determining compliance with permit limits. These records would also have to include the basis or supporting documentation for the selected factor(s). This would assure that the selected emission factors are memorialized in writing, along with the factual basis for the factors. This would make the relevant supporting information available to the Illinois EPA personnel as well to Cronus's staff, both present and future, for their review and use. The permit would also accommodate changes to "established" factors by Cronus if new information may become available.³⁴ A change to the established emission factor

³¹ These matters also were not discussed in the Project Summary.

³² As a general matter, an "emission factor" is a factor that relates the emission of a pollutant from an emission unit to the input to the unit (e.g., the amount of material processed), the output of the unit or other terms in which the amount of activity of an emission unit may be expressed. Common forms of emission factors are pounds of pollutant emitted per ton of material processed or produced or per million Btu fuel heat input. For the purposes of this discussion, the term "emission factor" specifically means an emission factor that appropriately addresses an emission unit at this facility. Such factors would be developed from testing or analysis that is conducted for emission units under representative operating conditions or would come from another authoritative source but be representative of the emissions of the particular unit at the facility. The term would accommodate representative rates for emissions in pounds per standard cubic foot (scf) of exhaust flow for units for which exhaust flow is monitored. It would also accommodate representative rates for emissions in pounds per hour for units, such as engines, that are typically either on or off. The term "emission factor" is not used in a broader sense to simply refer to the emission factor for a particular type of emission unit found in a published compendium of emission factors.

³³ It is not feasible or practical to conduct direct monitoring of HAP emissions to determine compliance with permit limits given the low emission rates and low concentrations of HAPs in exhaust streams. Given these circumstances, it would not be reasonable to require monitoring for HAPs even if it were feasible.

³⁴ Simple examples of circumstances in which an established emission factor must be reevaluated are when relevant testing or analysis is conducted for an emission unit that is subject to a permit limit. Established emission factors would also have to be reevaluated if Cronus has been using an emission factor developed by USEPA or by some other source and the USEPA or that other source revises its emission factor.

being used by Cronus would be mandatory if it is determined that the current emission factor would understate actual emissions.^{35, 36}

15. To ensure that the facility-wide restrictions on HAP emissions are practically enforceable, the permit should also require the source to calculate, on at least a monthly basis, emissions of HAPs from each emission unit.

The issued permit includes an additional provision requiring HAP emissions to be calculated on at least a monthly basis, as requested by this comment. (See Condition 1.5(c).) Given that the permitted HAP emissions of the facility are about 65 percent of the levels at which the facility would be a major source for emissions of HAPs, it is not unreasonable to require Cronus to calculate HAP emissions on a monthly basis, as requested by this comment.

GENERAL COMMENTS

- The regulations and the safeguards for this project are immense. Cronus has had to work with folks from the Illinois EPA, the USEPA, the Illinois Department of Commerce and Economic Opportunity and the U.S. Department of Labor. The regulations are very stringent; the community will be safe with this project.
- This project could well mean lower property taxes for the residents of Tuscola, better roads, better opportunities for lodging, for retail, for food in our community and the opportunity to grow local jobs, to branch out and connect with an agricultural sector that's so strong here in Illinois.
- My family operates a fifth-generation family farm in Illinois. We are concerned about the water safety; we are concerned about air safety. We have a long-term investment in this community. We want to raise our one-year-old daughter here and have her see the opportunities and the growth potential in Central Illinois, but we have to do it by creating jobs, good-paying jobs like this Cronus project will do.
- The local agricultural economy will be benefited by providing efficient access to Cronus's fertilizer products throughout the Midwestern Region.

³⁵ The relevant criterion for a mandatory change to an established emission factor is if the factor understates actual emissions. The permit would not preclude use of emission factors that overstate actual emissions. In particular, the source need not adjust the established emission factor after every emission test if the established emission factor has conservatively been set at a level above the test result.

³⁶ It should be recognized that this approach to the determination of emissions for purposes of verifying compliance with permit limits does not decouple the ongoing determination of emissions from the actual operation of such units. This is because the appropriate emission factor used to determine actual emissions can differ based on how a unit is operated. For example, if the normal emission factor for a unit is predicated on control of emissions by a scrubber and the unit operates for a period with a low scrubbant flow rate, it is appropriate for the emissions during such period to be calculated using a higher factor that accounts for actual condition of the scrubber during such period.

- A facility like Cronus being built in Tuscola will be a tremendous benefit to our community and its economy. This project will positively impact job growth, local tax revenues and bring nearly 2,000 new construction jobs to this region as the facility is being built. Once the plant is in operation, it is projected to provide over 200 well-paying, highly-skilled full-time jobs. These are jobs that are needed in this community.
- Tuscola has the right location, the right infrastructure, the right labor skills to make this project happen.
- As a retired farmer, I couldn't be more pleased with this type of project wanting to come to this area, especially this year as you look around and see all this green corn and green soybeans that we have coming out here. It takes fertilizer to grow that crop for our larger commercial farms and we would welcome this type of project. This is good fertilizer, this is clean fertilizer.
- While the plant is in operation, there will be routine maintenance needed and that will be continued opportunities for employment for routine maintenance shutdowns.
- Lincoln Land Building & Trades has worked closely with Cronus for several months negotiating a project labor agreement and are very near the end of that process. We are close to having a project labor agreement in place that will provide skilled, safe workers for the project to complete it in a timely fashion and cost-effective manner. Work has been scarce for our members the last few years. Some of them have had to travel many miles to find work and they would like to come to Tuscola and work closer to home.

FOR ADDITIONAL INFORMATION

Questions about the public comment period and the permit decisions should be directed to:

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LISTING OF SIGNIFICANT CHANGES BETWEEN THE DRAFT AND ISSUED PERMITS

Findings

Revised Finding 3(a) - As a result of the decision of the United States Supreme Court in *Utility Air Regulatory Group v. Environmental Protection Agency*, 2014 WL 2807314 (June 23, 2014), the legal basis for the facility being subject to the PSD rules for greenhouse gases (GHG) has changed, as now reflected in revised Finding 3(a). In this decision, the Supreme Court agreed that USEPA possesses the authority to subject GHG to PSD permitting for those facilities and projects whose emissions of pollutants other than GHG already subject them to PSD permitting (so called “anyway” sources”). However, the Court rejected USEPA’s position that GHG emissions, alone, should trigger PSD permitting. In this case, this facility is a major new source already subject to PSD permitting for pollutants other than GHG, including NO_x, CO, PM, PM₁₀ and PM_{2.5}. Given that the facility is subject to PSD for pollutants other than GHG, it is also subject to PSD permitting for GHG. This is because its potential GHG emissions are significant, i.e., more than 75,000 tons/year, as carbon dioxide equivalents (CO₂e). The draft permit, which was released prior to the Court’s decision, indicated that the facility was subject to PSD for GHG as a major new source given its potential GHG emissions, as CO₂e, are in excess of 100,000 tons/year. This is no longer the basis for the facility being subject to PSD for GHG.

Section 1: Source-Wide Permit Conditions

New Condition 1.5(b) – In response to comments concerning the adequacy of the limits on the potential emissions of hazardous air pollutants (HAPs) from certain units at the facility, the permit more comprehensively limits the HAP emissions of the facility. The additional condition requires the HAP emissions from the various emission units at the facility and the facility as a whole to comply with emission limits that are now set out in new Attachment 2 of the permit.* This condition also generally specifies how compliance with these limits is to be determined, indicating that compliance is to be determined based on activity and operating data for the various emission units and emission factors that do not understate actual emissions of those units, as developed from representative source-specific testing or analysis, USEPA methodology, or other authoritative source of data. The additional provisions will more clearly assure that the HAP emissions of the facility are limited to below the levels at which the facility would be a major source for HAP.

* Attachment 2 in the draft permit has been renumbered as Attachment 3.

Revised Condition 1.5(c) (Draft Condition 1.5(b)) - In response to comments concerning the adequacy of the compliance procedures accompanying the limits on the HAP emissions from certain units at the facility, enhancements have been made to this condition which generally required Cronus to keep records to verify compliance with the various permit limits for HAP emissions. This condition now provides that these records shall be kept for the various units at the facility and the facility as a whole. It also requires Cronus to keep a file containing the

emission factors that it uses to determine HAP emissions from the various emission units at the affected facility, with supporting documentation. It also requires records for the actual emissions of HAPs from emissions units to be prepared on at least a monthly basis. These enhancements to the recordkeeping required by this condition will further assure that the HAP emissions of the facility are properly determined and tracked to verify compliance with the emission limits that have been set to keep the facility's HAP emissions below the levels at which the facility would be a major source for HAP.

Revised Condition 1.7 (f) - In response to comments concerning the adequacy of the compliance procedures accompanying the annual limits on HAP and GHG emissions from certain units at the facility, enhancements have been made to this condition that generally addresses compliance procedures for annual limits set by the permit. In the draft permit, this condition only addressed the "compliance period" for annual limits set by the permit, specifying that annual limits apply on a rolling basis, rolled monthly starting after the facility has been in operation for 12 months. In the issued permit, this permit also generally addresses how emissions are to be determined for purposes of determining compliance with annual emission limits. This condition now specifies that where emission monitoring is required, compliance shall be determined from such monitoring. Where emission monitoring is not required, compliance shall be determined from emission data calculated as the product of activity or operating data and emission factors that do not understate emissions, as developed from representative source-specific testing or analysis. These enhancements to this condition will further assure that the emissions of the various emission units at the facility are properly determined and tracked to verify compliance with the annual emission limits that have been set by the permit.

Section 2.1: Unit-Specific Conditions for the Ammonia Plant

Revised Condition 2.1.2-3(b)(i)(B) – In response to comments expressing concerns over the approach to the evaluation of the GHG emission rate of the ammonia manufacturing process and possible downward adjustment of the BACT limit for the GHG emissions of this process, changes have been made in the approach to this evaluation that have resulted in changes to this condition. In particular, an evaluation by Cronus of the GHG emission rate that is achievable by the ammonia manufacturing process considering the actual performance of the facility is now mandatory. Accordingly, the extent of any adjustment of the BACT limit for GHG to increase its stringency that follows from this evaluation must be determined from the results of this evaluation, as well as other relevant information and analysis. The extent of this adjustment should not be predetermined or restricted by the permit. However, Condition 2.1.2-3(b)(i)(B) in the draft permit would have restricted the extent of this adjustment, by specifying the lowest values for GHG emission per ton of ammonia produced that could be used in the adjusted BACT limit. This provision of the draft permit, which would have restricted the extent of the adjustment of this BACT limit, has not been carried over into the issued permit.

New Condition 2.1.2-3(c) – In response to various comments concerning the methodology by which GHG emissions of the boiler and the CO₂ vents would be determined, this new condition provides that GHG emissions of the various emission units in the ammonia manufacturing process addressed by the permit (i.e., the CO₂ vents, the reformer and the boiler) are to be determined using relevant methodology from USEPA's rules for Mandatory Greenhouse Gas

Reporting, 40 CFR Part 98. For the reformer and the boiler, the applicable methodology in 40 CFR Part 98 Subpart C, Stationary Fuel Combustion Sources, must be implemented and followed. For the CO₂ vents, the methodology in 40 CFR Part 98 Subpart PP, Suppliers of Carbon Dioxide, is specified. These rules reflect specific consideration by USEPA of appropriate methodologies to measure and monitor CO₂ emissions from different types of emission units. They are appropriately relied upon as the basic compliance methodology for limits on GHG emissions set by the permit for the reformer, boiler and CO₂ vents. In addition, as testing for emissions of methane and nitrous oxide is required for the reformer and boiler, the permit appropriately provides that emissions of these pollutants shall be based on test results if testing show emissions rates higher than the rates specified in 40 CFR Part 98 Subpart C. Similarly, emissions of methane from the CO₂ vents must be addressed as part of the sampling and analysis of the streams going to the CO₂ vents.

Revised Condition 2.1.6(a) - In response to a comment specifically noting the absence from the draft permit of a limit on the annual emissions of “total HAPs” from the ammonia plant, the annual emissions of total HAPs from this plant have been limited. It is appropriate that the emissions of total HAPs from the ammonia plant specifically be limited by this condition because this condition limited the emissions of “any individual HAP” from this plant. Accordingly, this condition should more fully address HAP emissions of the ammonia plant with limits both for any individual HAP and for total HAPs.

Revised Condition 2.1.8-3(b) - In response to a comment, this condition now addresses the frequency of the sampling and analysis of the stream that is emitted through the CO₂ vents and other gas streams in the ammonia plant that would vent to the affected flares for their pollutant content. Sampling and analysis of the CO₂ stream is required on at least a monthly basis. Sampling and analysis of streams that would go to the flare is required on at least a monthly basis for the first 12 months of operation of the facility and on a quarterly basis thereafter. This frequency is appropriate to address potential variability in the composition of these streams so that any such variability is addressed when emissions from the CO₂ vents and the flares are determined.

In addition, this condition now provides that the initial sampling and analysis of these streams must be completed within the first 30 days of operation of the facility. The draft permit would have required that the initial sampling and analysis be completed much later, subject to the timing that is typically specified for initial emission testing. However, further consideration of periodic sampling and analysis in response to the comment also identified this flaw in the approach to the initial sampling and analysis. As periodic sampling and analysis should be required on a monthly basis, at least for the first 12 months of operation, the initial sampling and analysis of these streams should be required during the first month (30 days) of operation of the facility.

New Condition 2.1.9-1(a)* - In response to a comment concerning the compliance procedures for determining GHG emissions from various emission units at the facility, new Condition 2.1.9-1(a) addresses recordkeeping for GHG emissions from the CO₂ vents. Because the permit now specifies that the provisions of 40 CFR Part 98 Subpart PP are to be followed for the CO₂ vents, the recordkeeping required for GHG emissions is different from the recordkeeping required for

HAP emissions. The recordkeeping requirements for GHG emissions, including reference to 40 CFR Part 98 are now addressed in Condition 2.1.9-1(a).

* In the issued permit, Condition 2.1.9-1(a) from the draft permit has been renumbered as Condition 2.1.9-1(b). It no longer addresses GHG emissions, as recordkeeping related to GHG emissions is addressed in new Condition 2.1.9-1(a).

Revised Condition 2.1.11 - In response to comments expressing concerns over the approach to the evaluation of the GHG emission rate of the ammonia manufacturing process and possible downward adjustment of the BACT limit for the GHG emissions of this process, changes have been made in the approach to this evaluation that have resulted in a number of changes to this condition. As already discussed, the evaluation by Cronus of the GHG emission rate that is achievable by the ammonia manufacturing process considering its actual performance is now mandatory. This necessarily results in a number of changes to Condition 2.1.11, which addresses this evaluation. These changes, as further discussed below, are all a direct consequence of this evaluation now being mandatory, which is not unreasonable since it is possible that the performance of the facility will be better than the default values for GHG emission rates that were in the draft permit.

- The issued permit does not include Draft Condition 2.1.11(a)(ii).^{*} This condition would have provided for an automatic adjustment of the BACT limit for GHG emissions of the ammonia manufacturing process if Cronus elected to not conduct this evaluation, as would have been allowed by the draft permit, or if the evaluation were not completed in a timely manner. This automatic adjustment would have been made with specific “default values” for GHG emission rates, in tons of GHG per ton of ammonia produced, that are lower than the values that are initially applicable for the ammonia manufacturing process. However, since the evaluation is now mandatory, a provision for an automatic adjustment is no longer appropriate. In addition, the extent of any adjustment of the BACT limit for GHG to increase its stringency that follows from this evaluation should be determined from the results of this evaluation, as well as other relevant information and analysis. The extent of the adjustment should not be predetermined or restricted as would be provided by Draft Condition 2.1.11(a)(ii).

* As a result of this change, Condition 2.1.11(a)(iii) in the draft permit has been renumbered as Condition 2.1.11(a)(ii).

- Renumbered Condition 2.1.11(a)(ii) no longer refers to the default values for GHG emission rates. It also recognizes that when the Illinois EPA is deciding whether an adjustment to the BACT limit is appropriate and what the new values of GHG emission rates should be for the revised limit, the Illinois EPA may conduct its own assessment of the actual emission rate that is achievable for GHG. This assessment may consider information that is not included in the report that Cronus prepares for the evaluation of the performance of the facility that it must conduct.
- Condition 2.11(b)(i) now provides that Cronus must conduct this evaluation. It no longer provides that Cronus may elect to not conduct this evaluation, so that the BACT limit for

GHG emissions of the ammonia manufacturing process would automatically be subject to a downward adjustment with default values for GHG emission rates as specified in the permit.

- New Condition 2.1.11(b)(ii) provides that Cronus must provide annual progress reports while it is conducting this evaluation. This is because this evaluation is now a prerequisite to the adjustment of the BACT limit. Progress reports are appropriate to facilitate review by the Illinois EPA and other interested parties of the data that is being collected while the evaluation is underway.

* As a result of this change, Condition 2.1.11(b)(ii) in the draft permit, which deals with the duration and timing of the evaluation, has been renumbered as Condition 2.1.11(b)(iii).

- New Condition 2.1.11(b)(iv) now provides that the submittal by Cronus of the final report for this evaluation, as Cronus is required to do by Condition 2.1.11(b)(iii), will constitute submittal of an application of a revised permit for the purpose of a possible adjustment to the BACT limit for GHG emissions of the ammonia manufacturing process. This simplifies the process by which the performance of the facility would be formally addressed by the Illinois EPA and an adjustment to this BACT limit would be made. For Cronus, it avoids the need to submit a separate application for a possible revision to the permit. More generally, it requires the Illinois EPA to formally respond to Cronus' evaluation by acting on an application for a revised permit. These simplifications are appropriate because the permit would no longer provide for an automatic adjustment to this BACT limit as an alternative to Cronus conducting this evaluation.

Section 2.2: Unit-Specific Conditions for the Reformer Furnace

Revised Condition 2.2.7(a)(ii)(A) – In response to a comment, this condition now requires the initial emission testing of the reformer to be conducted within one year after initial startup of the reformer or 120 days after achieving the maximum production rate at which the reformer will be operated, whichever occurs first. The additional clause corrects an omission in the draft condition identified by the comment.

New Condition 2.2.7(a)(ii)(B) - In response to a comment, this new condition addresses periodic emission testing for the reformer. It provides that emission testing shall be conducted on a periodic basis following the initial testing, with such testing conducted within at least five years from the date of the previous test. This addresses the possibility that the processing and issuance of the Clean Air Act Permit Program permit for the facility, which permit must also address the frequency of periodic testing of the reformer, is delayed.

Section 2.3: Unit-Specific Conditions for the Boiler

New Condition 2.3.7(b)(i)(B)* - In response to a comment, this new condition addresses periodic emission testing for the boiler. It provides that emission testing shall be conducted on a periodic

basis following the initial testing, with such testing conducted within at least five years from the date of the previous test.

* As a result of the addition of this condition, Condition 2.3.7(b)(i)(B) in the draft permit has been renumbered as Condition 2.3.7(b)(i)(C).

Section 2.6: Unit-Specific Conditions for the Urea Plant

Revised Condition 2.6.5(a) - In response to a comment specifically noting the absence from the draft permit of a limit on the annual emissions of “total HAPs” from the urea plant, the annual emissions of total HAPs from this plant have been limited. It is reasonable for this condition to specifically limit the emissions of total HAPs from the urea plant, as requested by the comment. This is because, based on this comment, it is not clear that the limit for annual VOM emissions is also serving to limit the emissions of total HAPs from this plant.

Attachments

As already, discussed a new attachment has been included in the permit, Attachment 2, “Summary of the Permitted HAP Emissions of the Facility.” The Standard Permit Conditions that accompany construction permits are now Attachment 3 of the permit, rather than Attachment 2 as in the draft permit.*

* The Table of Contents of the permit has also been changed to refer to new Attachment 2 and to identify the Standard Permit Conditions as Attachment 3.